

A COMPARATIVE STUDY BETWEEN POSTURAL CORRECTION AND STRENGTH TRAINING IN IMPROVING RANGE OF MOTION AMONG FEMALES RECEIVING INTEGRATED NEUROMUSCULAR INHIBITORY TECHNIQUE FOR UPPER TRAPEZIUS TRIGGER POINT

DR. GOLLAVILLI SIRISHA¹, DR. M. RAJANI CARTOR² & DR. V. VENKATA RAMAIAH³

¹VAPMS College of Physiotherapy, Visakhapatnam, Andhra Pradesh, India

²Principal, VAPMS College of Physiotherapy, Visakhapatnam, Andhra Pradesh, India

³Professor, VAPMS College of Physiotherapy, Visakhapatnam, Andhra Pradesh, India

ABSTRACT

BACKGROUND

TRIGGER POINT

The discrete, focal, hyperirritable, palpable nodule in the taut bands of the skeletal muscle fascia is known to be a Trigger point. With trigger point, pain is produced locally and with a referred pattern. These often are present collaterally with chronic musculoskeletal disorders.

The striking behavioural response with pressure on a trigger point is a Jump sign.

INTEGRATED NEUROMUSCULAR INHIBITORY TECHNIQUE(INIT)

Application of ischemic pressure with stretch (muscle energy technique) in combination with deactivation of the trigger point manually is said to be the integrated neuromuscular inhibitory technique.

Muscle Energy Technique(MET)

Usage of muscle's own energy (isometric contraction) to relax the muscle via autogenic/reciprocal inhibition and lengthen the muscle is defined to be as Muscle Energy Technique.

POSTURAL CORRECTION

Holding the body upright against gravity while standing, sitting or lying down positions is Posture. A posture which makes you look great, feel more energetic and confident and which helps in preventing injury and reducing pain is said to be a good posture.

AIM

The aim of this study is to evaluate the efficacy of postural correction and strength training in improving the range of motion among females who are receiving integrated neuromuscular inhibitory technique for upper trapezius trigger point.

OBJECTIVE

To assess the functional status and neck flexibility in patients receiving postural correction and strength training along with integrated neuromuscular inhibitory technique for trapezius trigger point.

HYPOTHESIS

Null Hypothesis

There is no significant difference between postural correction and strength training in patients receiving integrated

neuromuscular inhibitory technique for upper trapezius trigger point.

Alternate Hypothesis

There is a significant difference between postural correction and strength training in patients receiving integrated neuromuscular inhibitory technique for upper trapezius trigger point.

MATERIAL & METHODOLOGY

MATERIALS

- Visual analogue scale
- Dumbbell
- Pillows
- Sand bags

STUDY DESIGN: *Pre and Post experimental*

SAMPLING METHOD : *Random sampling method*

SAMPLE SIZE : 30

SAMPLE SIZE : VAPMS college of physiotherapy
KGH out patient department

DURATION OF STUDY : *1 year.*

MEASURING TOOLS:

- VAS scale.
- Universal goniometer.

CRITERIA

Inclusion Criteria:

- Age :20-40
- Gender : Females
- Range of Motion : Less than 75° rotation of neck
- Pain : At least 3 on VAS scale

Exclusion Criteria

- Shoulder, cervical, thoracic degenerative pathology.
- Spine, neck and shoulder region traumatic history.
- Surgery to spine and shoulder.
- Congenital and acquired spinalde formities.
- Exposed to Trigger point injections.

METHODOLOGY

Treatment protocol for two groups

1 session (30 min) a day on alternate days for 4 weeks.

Group – A with integrated neuromuscular inhibitory technique and strength training exercises.

Group – B with integrated neuromuscular inhibitory technique and postural correction techniques.

STATISTICAL ANALYSIS:

In the study, the data collected will be analyzed by student 't' test.

KEYWORDS: *Integrated Neuromuscular Inhibitory Technique(INIT), Trigger Point, Strength Training, Postural Correction.*

Received: Mar 01, 2022; **Accepted:** Mar 21, 2022; **Published:** Apr 04, 2022; **Paper Id.:** IJMPSJUN202207

INTRODUCTION

The discrete, focal, hyperirritable, palpable nodule in the taut bands of the skeletal muscle fascia is known to be as Trigger point. Dr. Janet Travell has coined the term trigger point in 1942. Local tenderness, twitch response and distant pain (referred) are elicited upon direct compression or muscle contraction, this is said to be as jump sign ¹.

Though more common in females, myofascial trigger points appear in both genders.

Various reasons such as lack of exercise, continuous bad posture, emotional distress, high armrests, slump sitting (no firm back support), sitting slumped), forward head posture, shoulders held up positions may perpetuate trigger points².

Application of ischemic pressure with stretch (muscle energy technique) and strain-counter strain technique³ in combination with deactivation of the trigger point manually is said to be the integrated neuromuscular inhibitory technique.

A physical conditioning system in which to increase the strength of the muscles, they are exercised against an opposing force/resistance/weights is known as strength training. These resisted exercises are designed to improve strength and endurance. Isometrics and plyometrics⁶ are also incorporated into this strength training program.

Understanding the interactions between human and his surrounding elements and redesigning them to optimize well being and overall performance with the application of theory, principles, data and methods is known to be as Ergonomics²¹.

SOURCES -DATA

Study was Conducted at:

- KGH (King George Hospital Physiotherapy out patient department, visakhapatnam.
- VAPMS college of physiotherapy, ortho outpatient
 - Department visakhapatnam.

METHODS OF DATA COLLECTION:

STUDY DESIGN : Pre - test & Post - test experimental study design SAMPLE SIZE : 30 (15 subjects in each group)

SAMPLE DESIGN : Randomized sampling technique.

MATERIALS USED

- Informed consent form
- Assessment form
- Visual analog scale form
- Dumbbell
- Treatment table and pillow
- Sand bags or logrolls
- Pillows

MEASURING TOOLS

- Visual analogue scale
- Universal goniometer.

SAMPLING TECHNIQUE

Randomized sampling technique was utilised for this study. Upper trapezius trigger point subjects were selected.

30 patients were selected. 30 random numbers were generated from a computer or random number table. Then the two methods were randomly allocated to the random numbers. On each slip/paper, random numbers and methods were allocated and were printed. These slips were enclosed in an envelope and sealed. On the envelope, only the random numbers were printed. Verifying the criteria, subjects were explained the pros and cons and then the written consents were taken.

One envelope was selected and proceeded as per the method selected.

METHODOLOGY

Using a marker, the identified trigger point was marked. Pain scale was administered and then followed with the measurement of cervical range of motion.

Group A

Integrated neuromuscular inhibitory technique (INIT) along with strength training was administered for this group.

Treatment in total are 12 sessions, 1 session (30 min) a day on alternate days for 4 weeks, using pincer grip between thumb and index finger trigger point release was applied intermittently until the subject reported that the local or referred pain reduced. Later, subject's head was passively laterally flexed towards the affected side. while monitoring the trigger point pain with one hand, the therapist then held the patients forearm and moved the affected side shoulder passively (90 degree of abduction)

Using muscle energy technique, upper trapezius was stretched. The subject was instructed to take the stabilized shoulder towards the ear (a shrug movement), during which there should be mild and pain free contraction for 10 seconds. Upon complete relaxation effort, the therapist gently eased the head/neck into an increased degree of side bending with

rotation and the shoulder was stretched caudally, the stretch was then maintained for 10-30 seconds, initially as a warm up phase, strength training involves neck free exercises (subject in sitting position) such as flexion, extension, lateral flexion and rotation (five times each).

The therapist then stretches the upper trapezius (subject lying supine), with the subject's head supported in slight flexion by the therapist. The thenar side of the hand moves down towards muscle insertion and the other hand with the body bends the head and cervical spine to the opposite side. This is held for 10 sec and relaxed. Perform this thrice per session followed by Cervical isometrics (subject in sitting position) by giving resistance on the forehead (cervical flexion, extension, rotation and side-bending) for 10 sec with 15 sec break, repeated for 10-15 times in a progressive manner. Later (subject in standing position) instruct to do dumbbell exercises (shrug the shoulder), initially 1 kg weighted dumbbell, 2 sets with 5 min rest in between. Each set is of 15 repetitions (weights varying from 1 to 2 kg).

Group B

Integrated neuromuscular inhibitory technique (INIT) along with postural correction techniques was administered for this group.

Treatment in total is 12 sessions, 1 session (15 min) a day on alternate days for 4 weeks.

Postural correction techniques were taught to the subject and were practiced. The techniques include:

- Touch shoulders to ears/shrug and bring them down as much as possible.
- Draw the shoulder blades across the chest wall by spreading the front of the shoulders gently. Later bring the shoulder tips forwards as of trying to touch each other.
- Lift and drop the shoulder top gently as much as possible.
- The computer monitor screen's upper third is to be raised such that it is in line with the eyes of the subject.
- The mouse and keyboard are to be positioned in such a way to keep the forearms parallel and elbows perpendicular to the floor.
- The office chair must have a headrest to keep the back of one's flush against the chair while working.
- Never forget to blink and look away from the screen frequently.
- Take frequent intervals to relax the hands in a flat, straight posture.
- Do gentle exercises and stretches to relieve muscle fatigue every one hour.

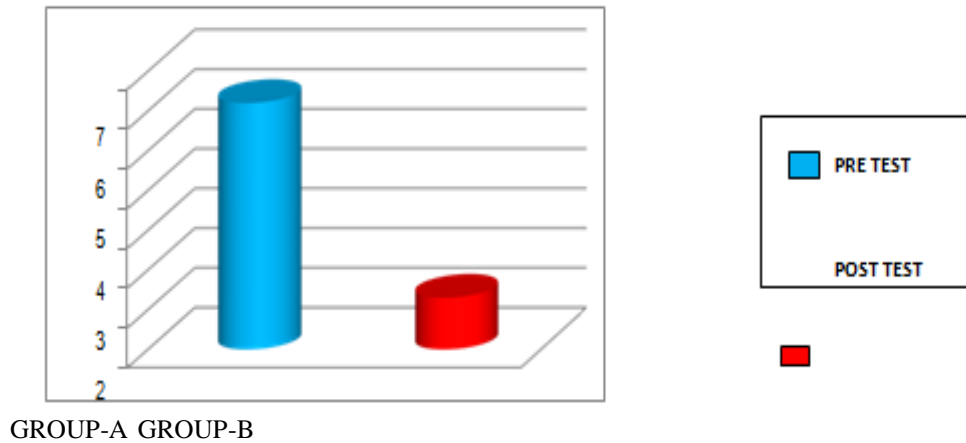
DATA ANALYSIS AND RESULTS

To find out the significant effects of parameters (pre and post) and also to compare the groups, analysis was done statistically. To know the significance of each parameter in pre and post treatment session, paired 't' test and for in between groups unpaired 't' test were done.

Table 1: Pre and Posttest VAS Recordings of GROUP-A

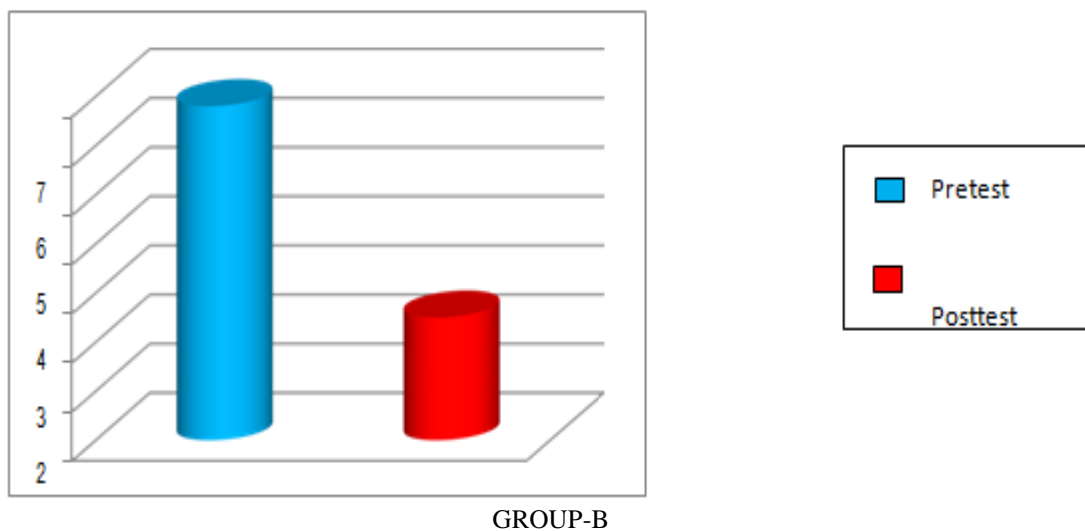
	MEAN	SD	SE	T14	L.O.S
Pre - test	6.2	1.16	0.29	17	0.0001
Post - test	1.3				

Table 1 shows the comparison of VAS in group A

**Table 2: Pretest and Posttest VAS recordings of GROUP-B**

	MEAN	SD	SE	T14	L.O.S
Pre - test	6.8	0.83	0.21	26.3	0.0001
Post - test	1.4				

Table 2 shows the comparison of VAS in GROUP-B

**Table 3: difference between post-test VAS score recordings of both the groups.**

	MEAN	SD	SE	t28	L.O.S
GroupA	1.3	0.81	0.29	-0.3	2.05
GroupB	1.4				

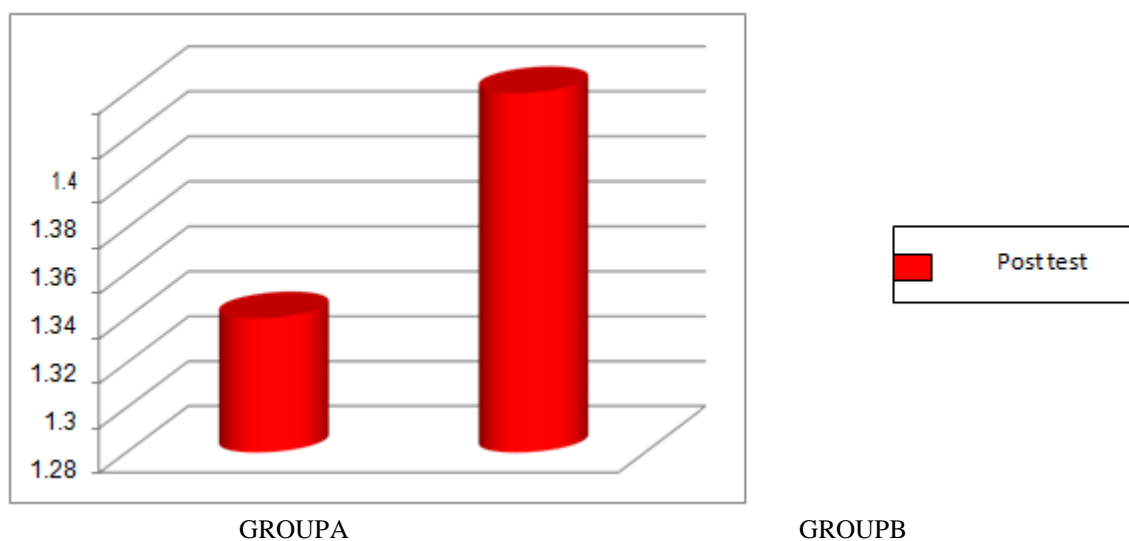


Table 4: Pre and Posttest ROM Recordings of GROUP A

	MEAN	SD	SE	T14	L.O.S
Pre test	70.9	1.08	0.26	-33.8	0.0001
Post test	79.6				

Table 4 shows the comparison of cervical range of motion in group A.

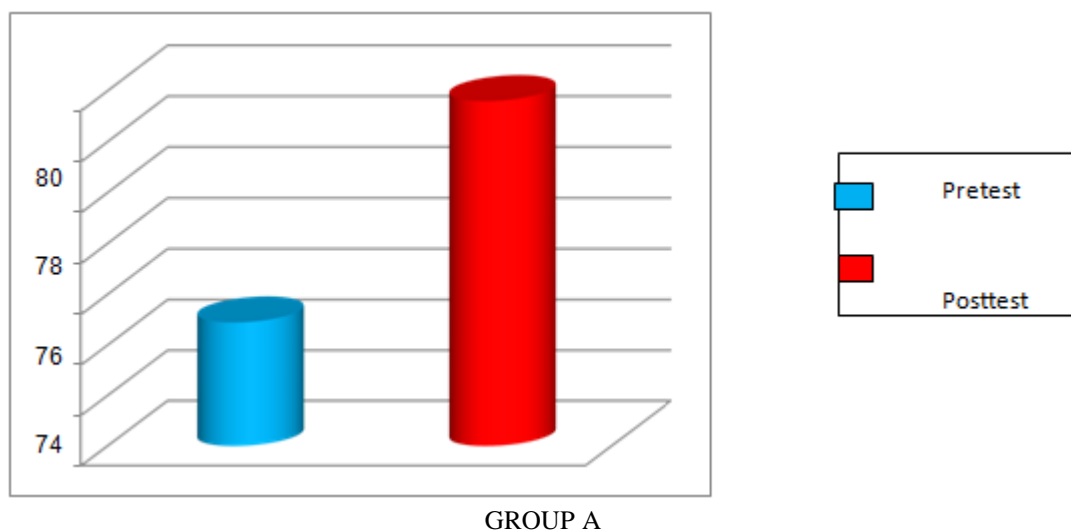


Table 5: Pre and Post Test ROM Recordings of GROUP B

	MEAN	SD	SE	T14	L.O.S
Pre test	69.9	2.15	0.55	-17.69	0.0001
Post test	78.6				

Table 5 shows the comparison of cervical range of motion in GROUP B.

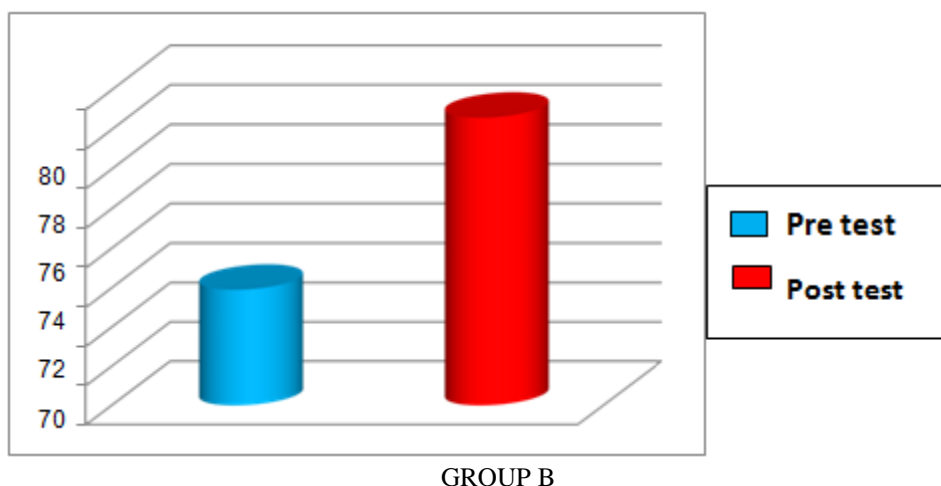
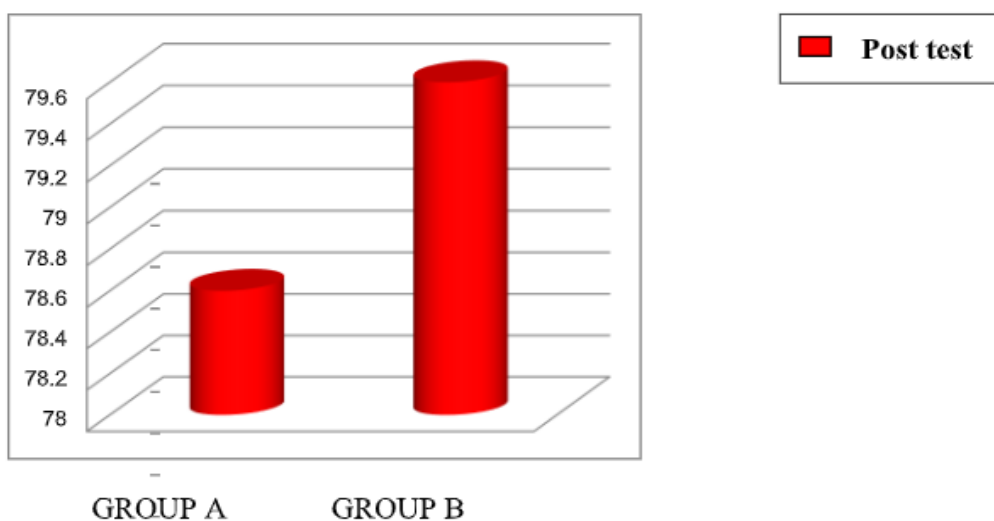


Table 6: Difference Between Post Test Recordings of ROM of Both the Groups.

	MEAN	SD	SE	T28	L.O.S
GroupA	78.6	2.19	0.78	-23.4	2.05
GroupB	79.6				

Table 6 shows the comparison of cervical range of motion between the groups.



The results are showing that there is effect of postural correction techniques in treating upper trapezius trigger point. Therefore, the alternate hypothesis is accepted and the null hypothesis is rejected.

DISCUSSIONS

Excessive release of acetylcholine produces sustained muscle fibre depolarization is what stated by the Integrated hypothesis theory.

An abnormal biochemical composition with elevated concentrations of nor adrenaline, serotonin, acetylcholine, and pH of low value constitutes the trigger point. The local area energy requirements are blocked due to the compression of blood vessels by these sustained muscle sarcomere contractions. If these sarcomeres along with motor end plates overacts, it leads to pathological changes at cellular levels which cause endogenous shortening of muscle fibres.

Trapezius is the muscle of choice because trapezius is more prone to trigger points and altering daily living activities. The incidence of trigger point formation in trapezius muscle can be reduced, if postural correction is done. After measuring the pressured pain threshold in eight varied muscles with a pressure algometer, Fischer determined that the upper trapezius was the most sensitive of all to the pressure.

Chukuka S stated that physical therapists often use postural correction to reduce the upper trapezius related neck pain and spasm. The central inhibitory pathways reduces the muscle activity with postural correction.

A significant reduction in pain and a notable increase in range of motion was found in subjects who have received strength training along with integrated neuromuscular inhibition technique (INIT).

In this study, pain intensities and range of motion (pre and post treatment values) were measured by visual analogue scale (VAS) scale by goniometer. The statistical analysis infers that there is a reduction in pain intensities.

Both the groups have shown improvements in reduction of pain and increased range of motion from baseline to end of the treatment protocol, but Group B showed more reduction of pain intensities and improvement in range of motion when compared to group A.

This statistical significance in outcome can be explained by these points as followed -

During trigger point pressure release by pain gate mechanism, the mechanoreceptors are activated and resulted in increased circulation ultimately in decreased pain and spasm. This was also compounded with the fact that postural correction techniques help in reducing the abnormal postures that may preserves trigger points in this muscle, thereby eliminating the trigger points.

CONCLUSIONS

Based on the data presented, it can be concluded that postural correction associated with integrated neuromuscular inhibitory technique lead to an improvement in the overall pain and range of motion compared to strength training associated with integrated neuromuscular inhibitory technique. In addition, both treatments improve the index of pain and functional range of motion, but the results show postural correction is more effective than strength training in treating upper trapezius trigger point

LIMITATIONS AND SUGGESTIONS

- For more valid and reliable results a long term study is necessary, which makes a limitation to this short term study.
- As subject dependent values are recorded, the abilities and understanding of the subject drive the results of the entire evaluation and its outcomes.
- To make the study more generalizable, a larger population is always recommended.
- Outcomes based on subjective sometimes lead to variations with their varied threshold levels and other body physiological status.
- Different pain scales and other methods of measurement can be used to access the pain scale and range of motion of the individual.

Further studies need to be conducted to prove the efficacy of the procedure and techniques involved in this study with Different age groups Large samples, Opposite gender, from specific fields like software engineers or long time computer workers.

REFERENCES

1. Simons DG, Travell JG, Simons LS, *myofascial pain and dysfunction: The trigger point manual vol 1*, 2nd edition; 1999 –194.
2. D Kaur, R Arora, L Arora, R Paul. Randomized controlled trail to study the efficacy of low level laser therapy combined with ischemic compression in the treatment of latent myofascial trigger points. 2014; 3(7):407-411.
3. Kannan P. Management of myofascial pain of upper trapezius: A Three group comparisons study. *Glob J Health Sciences*. 2012; 4(5):46-52.
4. Rickards LD, The effectiveness of non – invasive treatment for active MTrp pain: A systemic review of literature. *Int J osteopath Med*. 2006; 9(4):120-136.
5. Dandzinski, Hanmann LS. Myofascial pain unresponsive to standard management successful use of strain and counterstrain technique with physical therapy. *J Clin Rheumatol* 2000; 6 (4):169-74.
6. William E. Prentice. Micheal I. Voight. *Techniques in musculoskeletal rehabilitation*. 2001.
7. Sally Wegner, Gwendolen Jull, Shaun O'Leary, Venerina Johnston, The effect of a scapular postural correction strategy on trapezius activity in patients with neck pain volume 15, ISSUE6, P562-566, December 1, 2010.
8. Cigaran- Mendez M, Jimenez-Antona C, Paras-Bravo P, Fuenalida-Novo S, Rodriguez-Jimenez J, Fernandez-de-Las-Penas C. Active trigger points are associated with Anxiety and widespread pressure pain sensitivity in women, but not men, with tension type headache. *Pain Pract*. 2019Jun;19(5):522-529.
9. B.Jyothirmai, K.Senthil Kumar, S.Raghavkrishna, & K.Madhavi. (2015). Effectiveness of integrated neuromuscular inhibitory technique (INIT) with specific strength training exercises in subjects with upper trapezius trigger points. *International journal of physiotherapy*, 2(5), 759-764.
10. Amit V Nagrale, Paul Glynn and Gopich and Ramteke, The efficacy of integrated neuromuscular inhibitory technique on upper trapezius trigger points in subjects with non-specific neck pain: a randomized controlled trial(2004) *J Man Manip Ther*. 2010 Mar; 18(1): 37-43.
11. Al-Najjar, H.M.M., Mohammed, A.H.& Mossaad, D.M. Effect of ice massage with integrated neuromuscular inhibition technique on pain and function in subjects with mechanical neck pain: randomized controlled trial. *Bull Fac Phys Ther* 25, 10 (2020).<https://doi.org/10.1186/s43161-020-00011-x>.
12. Aggarwal S, Bansal G. Efficacy of integrated neuromuscular inhibitory technique in improving cervical function by reducing the trigger points on upper trapezius muscle: A randomized controlled trial. *Muller J Med Sci Res* 2018;9;1-6.
13. Ravichandran, P., Ponni, H. K., & Leo Asser, P.A.(2016). Effectiveness of ischemic compression on trapezius myofascial trigger points in neck pain. *International journal of physiotherapy*, 3(2), 186-192.<https://doi.org/10.15621/ijphy/2016/v3i2/94883>.
14. Phadke A, Bedekar N, Shyam A, Sancheti P. Effect of muscle energy technique and static stretching on pain and functional disability in patients with mechanical neck pain: A randomized controlled trial. *Hong Kong Physiother J*. 2016 Apr 14;35:5-11.[doi:10.1016/j.hkpj.2015.12.002](https://doi.org/10.1016/j.hkpj.2015.12.002).
15. George Mathew Sibby; S Kavitha Vishal; Narasimman. Effectiveness of integrated neuromuscular inhibitory technique and

- LASER with stretching in the treatment of upper trapezius trigger point. *Journal of Exercise Science and Physiotherapy* 01 December 2009.
16. Carlos Alberto Kelencz, PhD., Victor Alexandre F. Tarini, PhD., and Cesar Ferreira, PhD. Trapezius upper portion trigger points treatment purpose in positional release therapy with electromyographic analysis. *N Am J Med Sci* 2011 Oct; 3(10): 451-455.
 17. Laura Hodgson, Gary Fryer. The effect of manual pressure release on myofascial trigger points in the upper trapezius muscle. Volume 9, ISSUE 1, P33, March 01, 2006.
 18. Hugh Gemmell, Anna Allen. Relative immediate effect of ischaemic compression and activator trigger point therapy on active upper trapezius trigger points: A randomized trial. *Clinical Chiropractic*, Volume 11, Issue 4, December 2008, pages 175-181.
 19. G Yatheendra Kumar, P Sneha, N Sivajyothi. Effectiveness of Muscle energy technique, Ischaemic compression and Strain counterstrain on Upper Trapezius trigger points: A comparative study. *International journal of physical education, sports and Health* 1 (3), 22-26, 2015.
 20. Amir Iqbal, Sohrab A Khan, Mohd Miraj. Efficacy of ischaemic compression technique in combination with strain counterstrain technique in managing upper trapezius myofascial trigger point pain. *Indian Journal of Physiotherapy and Occupational Therapy* 4(2), 10-15, 2010.
 21. Fabrizio P. Ergonomic intervention in the treatment of a patient with upper extremity and neck pain. *Phys Ther.* 2009 Apr; 89(4):351-60. doi:10.2522/ptj.20080209. Epub 2009 Feb 26.
 22. Jung Won Kwon PhD PT, Sung Min Son, PhD PT, and Na Kyung Lee, PhD, PT. Changes in upper-extremity muscle activities due to head position in subjects with a forward head posture and rounded shoulders. *J Phys Ther Sci.* 2015 Jun; 27(6):1739-1742. Published online 2015 Jun 30.
 23. Aguilera FJ, Martin DP, Masanet RA, Botella AC, Soler LB, Morell FB. Immediate effect of ultrasound and ischemic compression techniques for the treatment of trapezius latent myofascial trigger points in healthy subjects: a randomized controlled study. *J Manipulative Physiol Ther.* 2009 Sep; 32(7):515-20. Doi:10.1016/j.jmpt.2009.08.001.
 24. Kaur K, Das P, Lenka PK, Answer S. Immediate effect of posture correction of trapezius activity in computer users having neck pain – An Electromyographic analysis. *The internet journal of allied health sciences and practice.* Oct 2013. Volume 11 Number 4.
 25. Dimitrios Kostopoulos, PT, PhD, DSc, Arthur J. Nelson Jr., PT, PhD, Reuben S. Ingber, MD and Ralph W. Larkin, PhD. Reduction of spontaneous electrical activity and pain perception of trigger points in the upper trapezius muscle through trigger point compression and passive stretching. *Pub* 10 Jul 2009, pages 266-278.
 26. Farshad Okhovatian, Royah Mehdikhani, Sedigheh sadat Naimi. Comparison between the immediate effect of manual pressure release and strain/counter strain techniques on latent trigger point of upper trapezius muscle, 8 June 2012.
 27. Wewers ME, Lowe NK. A critical review of visual analogue scales in the measurement of clinical phenomena. *Res Nurs Health.* 1990 Aug; 13(4):227-36. doi:10.1002/nur.4770130405.
 28. Aranha MFM, Muller CEE, Gaviao MBD. Pain intensity and cervical range of motion in women with myofascial pain treated with acupuncture and electroacupuncture; a double-blinded, randomized clinical trial. *Braz J Phys Ther.* 2015 Jan-Feb; 19(1):34-43. <http://dx.doi.org/10.1590/bjpt-rbf.2014.0066>.
 29. Hannah Dellabella. Gender differences in trigger points in tension type headache March 26, 2019.
 30. Shete MG, Shah R. Effect of posture correction exercises and ergonomic advices in people having postural abnormalities

- among chronic smartphone users. Int J Health Sci Res. 2019;9(7):121-125.*
31. ROHINI, ADITI, et al. "Monitoring Of Analgesic Component During Anaesthesia." *International Journal of Electronics, Communication & Instrumentation Engineering Research and Development (IJECIERD)* 4 (2014): 41-46.
 32. Lee, Jung-Ho. "A Study on an Effective Method to Apply Upper Limb Rehabilitation Treatment to Stroke Patients." *NVEO-Natural Volatiles & Essential Oils Journal| NVEO* (2021): 4957-4974.
 33. Premkumar, KS. "Ergonomics in orthodontics-a review." *International Journal of Dental Research and Development* 6.4 (2016): 20.
 34. Lakshmi, V. Vijaya, J. Deepika, and S. Logeswari. "Evaluation of thoracic kyphosis and lumbar lordosis among vdt workers and kitchen workers." *Int J Educ Sci Res* 7.1 (2017): 101-8.